



**U.S. Army  
Environmental  
Center**

**DISTRIBUTION STATEMENT A**  
Approved for Public Release  
Distribution Unlimited

**NO FURTHER ACTION DECISION UNDER  
CERCLA**

**STUDY AREA 43N  
HISTORIC GAS STATION SITES  
FORT DEVENS, MASSACHUSETTS**

**CONTRACT DAAA15-91-0008**

**U.S. ARMY ENVIRONMENTAL CENTER  
ABERDEEN PROVING GROUND, MARYLAND**

**JANUARY 1995**

**PRINTED ON RECYCLED PAPER**

**20070502731**

**NO FURTHER ACTION DECISION UNDER CERCLA  
STUDY AREA 43N  
HISTORIC GAS STATION SITES  
FORT DEVENS, MASSACHUSETTS**

*Prepared for:*

U.S. Army Environmental Center  
Aberdeen Proving Ground, Maryland  
Contract DAAA15-91-0008

*Prepared by:*

ABB Environmental Services, Inc.  
Portland, Maine  
Project No. 7053-12

JANUARY 1995

**NO FURTHER ACTION DECISION UNDER CERCLA  
STUDY AREA 43N  
HISTORIC GAS STATION SITES  
FORT DEVENS, MASSACHUSETTS**

**TABLE OF CONTENTS**

<u>Section</u>	<u>Title</u>	<u>Page No.</u>
EXECUTIVE SUMMARY .....		ES-1
1.0	INTRODUCTION .....	1-1
2.0	BACKGROUND AND PHYSICAL SETTING .....	2-1
2.1	DESCRIPTION AND LAND USE .....	2-1
2.2	REGIONAL GEOLOGY .....	2-2
2.3	REGIONAL HYDROGEOLOGY .....	2-2
2.4	STUDY AREA DESCRIPTION AND HISTORY .....	2-3
3.0	RELATED INVESTIGATIONS .....	3-1
3.1	MASTER ENVIRONMENTAL PLAN .....	3-1
3.2	ENHANCED PRELIMINARY ASSESSMENT .....	3-1
3.3	SITE INVESTIGATION REPORT .....	3-1
3.4	PRELIMINARY RISK EVALUATION .....	3-3
4.0	CONTAMINATION ASSESSMENT .....	4-1
4.1	SOILS .....	4-1
4.2	GROUNDWATER .....	4-2
5.0	PRELIMINARY HUMAN HEALTH RISK EVALUATION .....	5-1
6.0	PRELIMINARY ECOLOGICAL RISK EVALUATION .....	6-1
7.0	CONCLUSIONS .....	7-1
8.0	DECISION .....	8-1

---

**ABB Environmental Services, Inc.**

**NO FURTHER ACTION DECISION UNDER CERCLA  
STUDY AREA 43N  
HISTORIC GAS STATION SITES  
FORT DEVENS, MASSACHUSETTS**

**TABLE OF CONTENTS  
(continued)**

<u>Section</u>	<u>Title</u>	<u>Page No.</u>
----------------	--------------	-----------------

**GLOSSARY OF ACRONYMS AND ABBREVIATIONS**

**REFERENCES**

---

**ABB Environmental Services, Inc.**

**NO FURTHER ACTION DECISION UNDER CERCLA  
STUDY AREA 43N  
HISTORIC GAS STATION SITES  
FORT DEVENS, MASSACHUSETTS**

**LIST OF FIGURES**

<u>Figure</u>	<u>Title</u>
2-1	Location of SA 43N at Fort Devens
2-2	Soil Boring, TerraProbe, and Monitoring Well Locations
4-1	ATEC Field Screening Locations
4-2	Field Analytical Results
4-3	Analytes in Soil
4-4	Analytes in Groundwater

---

**ABB Environmental Services, Inc.**

**NO FURTHER ACTION DECISION UNDER CERCLA  
STUDY AREA 43N  
HISTORIC GAS STATION SITES  
FORT DEVENS, MASSACHUSETTS**

**LIST OF TABLES**

<u>Table</u>	<u>Title</u>
4-1	ATEC Field Screening/Laboratory Results
4-2	Field Analytical Results
4-3	Analytes in Subsurface Soil
4-4	Analytes in Groundwater
5-1	Human Health PRE Evaluation of Subsurface Soil
5-2	Human Health PRE Evaluation of Groundwater

---

**ABB Environmental Services, Inc.**

**EXECUTIVE SUMMARY**

Investigations of Study Area 43N (Historic Gas Station Site) at Fort Devens, Massachusetts have resulted in the decision that no further hazardous waste studies or remediation are required at this site. Study Area 43N was identified in the Federal Facilities Agreement between the U.S. Environmental Protection Agency and the U.S. Department of Defense as a potential site of contamination.

Fort Devens was placed on the National Priorities List under the Comprehensive Environmental Response, Compensation and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, on December 21, 1989. In addition, under Public Law 101-510, the Defense Base Realignment and Closure Act of 1990, Fort Devens was selected for cessation of operations and closure. In accordance with these acts, numerous studies, including a Master Environmental Plan, an Enhanced Preliminary Assessment, and a Site Investigation, have been conducted which address Study Area 43N.

Study Area 43N, one of the 19 Historic Gas Station Sites, is included in the Group 2 Study Areas located on the Main Post. The structures of the historic gas station at Study Area 43N consisted of a pump island and a small gasoline pumphouse. Based on historic records, the gas station appears to have had one 5,000-gallon underground storage tank (UST) located between the gasoline pumphouse and the pump island. The station was used during World War II as a vehicle motor pool to support military operations. The motor pool operations were discontinued during the late 1940s or early 1950s. No records were available on the decommissioning of this motor pool or the removal of the associated UST. The area where Study Area 43N was reportedly located is currently a paved parking lot for the former installation car wash (Study Area 45), located on Lake George Street in the western portion of the Main Post.

Field investigation of Study Area 43N was initiated in 1992 in conjunction with the other 13 Groups 2, 7, and Historic Gas Stations Site Investigations at Fort Devens. The Site Investigation at Study Area 43N consisted of surficial geophysical surveys, which included a metal detector and ground penetrating radar survey, 10 TerraProbe points, and one soil boring.

The geophysical surveys indicated that one abandoned UST was present on the east side of the site. This tank was removed by ATEC Environmental Consultants (ATEC) on

---

**ABB Environmental Services, Inc.**

## **EXECUTIVE SUMMARY**

---

June 23 and 24, 1992. No visually contaminated soil was observed in the excavation, and groundwater was not encountered. ATEC performed field screening for volatile organic compounds (VOCs) and total petroleum hydrocarbon compounds (TPHC) on eight soil samples collected from the walls of the excavation. The photoionization detector headspace screening showed VOC concentrations ranging from 0.8 to 56 parts per million (ppm) in this sample. TPHC were detected at concentrations ranging from 28.9 to 99.9 ppm. ABB Environmental Services, Inc. collected one composite sample from the bottom of the excavation for off-site laboratory analysis. TPHC was detected at 136 ppm in this composite sample. Based on ATEC's sampling results, the excavation was backfilled. Because TPHC concentrations were above 100 ppm in the composite sample, ABB Environmental Services, Inc. conducted additional site investigation activities.

ABB Environmental Services, Inc. completed 10 TerraProbe points to the top of bedrock and/or the water table, and a total of nine soil samples were collected. The soil samples were analyzed in the field for benzene, toluene, ethylbenzene, and xylenes (BTEX) and TPHC. No BTEX was detected in any of the TerraProbe soil samples collected. TPHC was detected in three soil samples ranging from 91 to 380 ppm.

Based on the results of the TerraProbe samples, one soil boring was advanced through the former UST excavation to the top of the bedrock and one confirmatory soil sample was collected from the top of bedrock, 12 to 14 feet below ground surface (bgs), for laboratory analysis. The water table was encountered at 12.5 feet bgs in the soil boring. This soil sample was analyzed for VOCs, lead, and TPHC. No VOCs were detected in the sample and lead was detected below the Fort Devens background concentration. TPHC was detected at 258 ppm.

On the basis of the Site Investigation findings at Study Area 43N and the human health preliminary risk evaluation, there was no evidence to conclude that petroleum contamination had caused significant environmental contamination or poses a threat to human health. However, evidence of TPHC at the water table suggested that groundwater contamination might be present at Study Area 43N. Because of these findings additional field investigations were recommended.

A Supplemental Site Investigation field investigation was completed in 1993 to identify if TPHC contamination detected during the Site Investigation had adversely impacted groundwater quality at Study Area 43N. The field activities included the installation of four groundwater monitoring wells, the collection of three subsurface soil samples for

---

**ABB Environmental Services, Inc.**



## EXECUTIVE SUMMARY

---

laboratory analysis, two rounds of groundwater sampling, and hydraulic conductivity tests. The soil samples were analyzed for VOCs, semivolatile organic compounds (SVOCs), lead, and TPHC. The laboratory results for the subsurface soil samples indicated that TPHC was present in one subsurface soil sample.

Two rounds of groundwater samples were collected from each of the newly installed monitoring wells. The samples were analyzed for VOCs, SVOCs, lead, and TPHC. The results of the first round of groundwater sampling indicated the presence of low concentrations (less than 1.0 micrograms per liter) of toluene and phenanthrene. Lead was detected above the Fort Devens background concentration in the unfiltered samples but below the background concentration in the filtered sample. TPHC was not detected.

The results of the second round of groundwater sampling did not show the same concentrations of toluene or phenanthrene. Lead was detected above the Fort Devens background in one of the four unfiltered samples but below detection limit in all four filtered samples. TPHC was detected in one of the downgradient monitoring wells, but the concentration was below relevant action limits.

On the basis of the findings at Study Area 43N and the human health preliminary risk evaluation, there is no evidence or reason to conclude that past site activities have caused environmental contamination or that contamination poses a significant risk to human health. The decision has been made to remove Study Area 43N from further consideration in the Installation Restoration Program.

THIS PAGE INTENTIONALLY LEFT BLANK

## **1.0 INTRODUCTION**

This decision document has been prepared to support a no further action decision at Study Area (SA) 43N at Fort Devens, Massachusetts. The report was prepared as part of the U.S. Department of Defense (DoD) Base Realignment and Closure (BRAC) program to assess the nature and extent of contamination associated with site operations at Fort Devens.

In conjunction with the U.S. Army's Installation Restoration Program (IRP), Fort Devens and the U.S. Army Environmental Center (USAEC; formerly the U.S. Army Toxic and Hazardous Materials Agency) initiated a Master Environmental Plan (MEP) in 1988. The MEP consists of assessments of the environmental status of SAs, specifies necessary investigations, and provides recommendations for response actions with the objective of identifying priorities for environmental restoration at Fort Devens. The Historic Gas Station Sites were identified in the MEP as potential areas of contamination. On December 21, 1989, Fort Devens was placed on the National Priorities List under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act.

An Enhanced Preliminary Assessment (PA) was also performed at Fort Devens to address areas not normally included in the CERCLA process, but requiring review prior to closure. A final version of the PA report was completed in April 1992. In 1992, DoD, through USAEC, also initiated a Site Investigation (SI) for SAs 43A through S, along with the other 13 SAs in SA Groups 2, 7 and Historic Gas Stations at Fort Devens. A Supplemental SI (SSI) program was also conducted in 1993. The SI and SSI were conducted by ABB-ES.

Under Public Law 101-510, the Defense Base Realignment and Closure Act of 1990, Fort Devens has been selected for cessation of operations and closure. An important aspect of BRAC actions is to determine environmental restoration requirements before property transfer can be considered. Studies at SA 43N were conducted to support this overall mission.

---

**ABB Environmental Services, Inc.**

THIS PAGE INTENTIONALLY LEFT BLANK

## **2.0 BACKGROUND AND PHYSICAL SETTING**

### **2.1 DESCRIPTION AND LAND USE**

Fort Devens is located approximately 35 miles northwest of Boston, Massachusetts, within Middlesex and Worcester counties. The installation consists of approximately 9,280 acres and includes portions of the towns of Ayer, Harvard, Lancaster, and Shirley. Cities in the vicinity include Fitchburg, Leominster, and Lowell. Land surfaces range from about 200 feet above mean sea level (MSL) along the Nashua River in the northern portion of the installation to 450 feet above MSL in the southern portion of the installation.

Fort Devens was established in 1917 as Camp Devens, a temporary training camp for soldiers from the New England area. In 1931, the camp became a permanent installation and was redesignated as Fort Devens. Throughout its history, Fort Devens has served as a training and induction center for military personnel and a unit mobilization and demobilization site. All or portions of these functions occurred during World Wars I and II, the Korean and Vietnam conflicts, and operations Desert Shield and Desert Storm. The primary mission of Fort Devens is to command, train, and provide logistical support for non-divisional troop units. The installation also supports that portion of the U.S. Army Intelligence School located at Fort Devens, the Army Readiness Region, Reserve Components, and Army Reserve and National Guard in the New England area.

Fort Devens currently consists of three major land use areas: Main Post, South Post, and North Post.

The majority of the facilities on Fort Devens are located in the Main Post area, north of Massachusetts Highway 2. The Nashua River intersects the Main Post along its western edge. The Main Post provides all of the on-post housing, including over 1,700 family units and 9,800 bachelor units (barracks and unaccompanied officer's quarters). Other facilities on the Main Post include community support activities (such as a shoppette, cafeteria, post exchange, commissary, bowling alley, golf course, and hospital), administrative buildings, classrooms and training facilities, maintenance facilities, and ammunition storage facilities. The Historic Gas Station Sites, including SA 43N, are located on the Main Post (Figure 2-1).

---

**ABB Environmental Services, Inc.**

## **SECTION 2**

---

The South Post is located south of Massachusetts Highway 2 and contains individual training areas designated for troop training, range activities, and a drop zone. The Nashua River bounds the South Post on the northeast side.

The North Post is directly north of the Main Post. The principal activities on the North Post are the Douglas E. Moore Army Airfield, and the installation Waste Water Treatment Plant.

### **2.2 REGIONAL GEOLOGY**

Fort Devens is near the western boundary of the Seaboard Lowland Section of the New England-Maritime Physiographic province (Jahns, 1953). It is adjacent to the Worcester County Plateau of the Central Uplands province, and part of the installation lies within the province (Koteff, 1966). The land surface is almost completely covered with unconsolidated glacial outwash deposits, resulting in few bedrock outcrops. The surficial deposits are underlain by a highly complex assemblage of intensely folded and faulted metasedimentary rocks with occasional igneous intrusions. The geomorphology of the region is dominated by glacial features such as outwash plains, kames, kame terraces, drumlins, and eskers.

### **2.3 REGIONAL HYDROGEOLOGY**

Groundwater at Fort Devens occurs largely in the permeable glacial-deltaic outwash deposits of sand, gravel, and boulders. Well yields within these sediments are dependent upon the hydraulic characteristics of the aquifer and can range from 2 to over 300 gallons per minute (gpm). Small amounts of groundwater can be obtained from fractured bedrock with yields ranging from 2 to 10 gpm. Minor amounts of groundwater may be found in thin, permeable glacial lenses elsewhere on the installation. The primary hydrogeologic feature at Fort Devens is the Nashua River, which flows through the installation in a south to north direction, with an average discharge rate of 55 cubic feet per second. In addition to the Nashua River, the terrain is crossed by numerous brooks and attendant wetlands. There are also several kettle ponds and one kettle lake located within the installation.

#### **2.4 STUDY AREA DESCRIPTION AND HISTORY**

SA 43N, one of the 19 Historic Gas Station Sites, is included in the Group 2 SAs located on the Main Post. The structures of the historic gas station at SA 43N consisted of a pump island and a small gasoline pumphouse. Based on historic records, the gas station appears to have had one 5,000-gallon underground storage tank (UST) located between the gasoline pumphouse and the pump island. The station was used during World War II as a vehicle motor pool to support military operations. The motor pool operations were discontinued during the late 1940s or early 1950s. No records were available on the decommissioning of this motor pool or the removal of the associated UST. The area where SA 43N was reportedly located is currently a paved parking lot for the former installation car wash (SA 45), located on Lake George Street in the western portion of the Main Post (Figure 2-2).

THIS PAGE INTENTIONALLY LEFT BLANK



### **3.0 RELATED INVESTIGATIONS**

#### **3.1 MASTER ENVIRONMENTAL PLAN**

SA 43, the Historic Gas Station Sites, was identified as a possible source for release of contaminants into the environment. The 19 gas stations were identified from a circa 1941 map (Barbour, 1941). The MEP recommended that the remaining USTs be located, and residual contamination in soil be removed (Biang, et al., 1992).

#### **3.2 ENHANCED PRELIMINARY ASSESSMENT**

The PA included a review of the study and recommendations presented in the MEP and considered other areas that might require evaluation due to the closure of Fort Devens. No additional findings or recommendations for SA 43N were provided in the PA.

#### **3.3 SITE INVESTIGATION REPORT**

The SI was initiated in June 1992 and included the following 13 Group 2 and 7 SAs originally identified in the MEP.

- SA 13 Landfill No. 9
- SA 43 Historic Gas Stations (19 Sites)
- SA 45 Lake George Street Vehicle Wash Area
- SA 49 Building 3602 Leaking Underground Storage Tank (LUST) Site
- SA 56 Building 2417 LUST Site
- SA 57 Building 3713 Fuel Oil Spill
- SA 58 Buildings 2648 and 2650 Fuel Oil Spills
- SA 12 Landfill No. 8
- SA 14 Landfill No. 10
- SA 27 Waste Explosive Detonation Range (Hotel)
- SA 28 Waste Explosive Detonation Range (Training Area 14)
- SA 41 Unauthorized Dumping Area (Site A)
- SA 42 Popping Furnace

---

**ABB Environmental Services, Inc.**

### SECTION 3

---

The SI was conducted by ABB Environmental Services, Inc. (ABB-ES) under contract with the USAEC. The Final Site Investigation Report was issued May 1993 (ABB-ES, 1993). The purpose of the SI was to verify the presence or absence of environmental contamination and to determine whether further investigation or remediation was warranted.

The SI field investigation program for SA 43N was conducted in June 1992 and consisted of a surficial geophysical program which included a metal detector and ground penetrating radar (GPR) survey. The geophysical investigation conducted at SA 43N indicated that one abandoned UST was present on the eastern side of the parking area (see Figure 2-2). The metal detector was used first to locate the UST and then the GPR survey identified the ends and the sides of the UST. The geophysical measurements collected in the field are presented in Appendix L of the Groups 2, 7, and Historic Gas Stations Final SI Report (ABB-ES, 1993).

The 5,000-gallon UST at SA 43N was removed by ATEC Environmental Consultants (ATEC) on June 23 and 24, 1992. The tank was observed to be in good condition, without holes, perforations, or severe corrosion. Associated piping, however, was corroded (ATEC, 1992). No visually contaminated soil was observed in the excavation, and groundwater was not encountered. Soil samples were collected from the excavation to determine whether the contents of the UST had adversely impacted soil or groundwater quality at SA 43N. The results of the analyses are presented in Section 4.0.

Following the UST removal, ABB-ES conducted a TerraProbe survey, which included 10 TerraProbe points and the collection of nine subsurface soil samples from the water table and/or the top of bedrock. Based on the results of the TerraProbe survey, ABB-ES completed one confirmatory soil boring through the former UST excavation and collected one soil sample for laboratory analysis. The results of this investigation are presented in Section 4.0.

Based on the results of the SI, an SSI field investigation was conducted by ABB-ES in August 1993, consisting of installing four groundwater monitoring wells, collecting four subsurface soil samples from the top of bedrock in each monitoring well boring, and collecting two rounds of groundwater samples from the newly installed monitoring wells. The results are presented in Section 4.0.

---

**ABB Environmental Services, Inc.**

### 3.4 PRELIMINARY RISK EVALUATION

A Preliminary Risk Evaluation (PRE) for human health was performed as part of the SI to assess environmental contamination and help establish future action at SA 43N. This section presents the general approach employed for the SI PRE. Details of the SA 43N human health PRE are presented in Section 5.0. An ecological PRE was not conducted for SA 43N because contaminants associated with the former UST would be confined to subsurface soil and would not affect ecological receptors.

To evaluate the human health risk associated with TPHC in soil, ABB-ES has developed risk-based concentrations for petroleum products. These concentrations have been calculated using the same exposure assumptions as those used by USEPA toxicologists in the USEPA Region III Risk-Based Concentration Table (Fourth Quarter, 1993) for commercial/industrial soil. A more detailed discussion of these risk-based concentrations is provided in the Fort Devens Final SI Report for Groups 2, 7, and Historic Gas Station (ABB-ES, 1993) and the Supplemental Site Investigation Data Package (ABB-ES, 1994). For gasoline the risk-based commercial/industrial soil concentration is 1,680  $\mu\text{g/g}$ .

In addition to the calculated risk-based concentrations, using Region III methodology, the PRE included the Massachusetts Department of Environmental Protection's (MADEP) revised Massachusetts Contingency Plan (MCP) promulgated Method 1 soil standards (MADEP, 1993). For a Method 1 Risk Characterization under the MCP, compliance with these soil standards constitutes a demonstration of no significant health risk from exposure to oil or hazardous material in soil. In this evaluation of residual risk, Method 1 S-2/GW-1 soil standards are used as risk-based guidelines along with the calculated risk-based concentrations. At SA 43N, the subsurface soil best fits the S-2 soil category. For TPHC, the S-2/GW-1 standard is 2,500  $\mu\text{g/g}$ .

The human health PRE for groundwater at SA 43N used the concentrations from the May 1993 publication of the USEPA Office of Water entitled "Drinking Water Regulations and Health Advisory" (USEPA, 1993); the Autumn 1993 publication of Massachusetts Drinking Water Standards and Guidelines (MADEP, 1993); and, the revised MCP Method 1 GW-1 standard for TPHC.

THIS PAGE INTENTIONALLY LEFT BLANK

## 4.0 CONTAMINATION ASSESSMENT

### 4.1 SOILS

At the time of the tank removal, ATEC performed field screening on eight soil samples collected from the excavation walls at depths of 4 to 6 feet below ground surface (bgs) (Figure 4-1). The headspaces of each soil sample were screened with a photoionization detector (PID) for volatile organic compounds (VOCs). A Non-Dispersive Infrared (NDIR) Analyzer was used to screen for total petroleum hydrocarbon compounds (TPHC). The PID headspace screening showed VOC concentrations ranging from 0.8 to 56 parts per million (ppm). TPHC was detected at concentrations ranging from 28.8 to 99.9 ppm (Table 4-1). ABB-ES collected one confirmatory composite soil sample from the bottom of the excavation. This sample was analyzed at ABB-ES' Wakefield, Massachusetts laboratory for TPHC using U.S. Environmental Protection Agency (USEPA) Method 418.1. The results of the TPHC analysis indicated a concentration of 136 ppm (see Table 4-1). Based on the results of ATEC's sampling and analysis, ATEC backfilled the excavation. However, the results of the composite soil sample collected by ABB-ES indicated that TPHC concentrations were above 100 ppm. In accordance with the project work plan, additional investigation was warranted.

After the former UST excavation was backfilled, ABB-ES completed 10 TerraProbe points and collected nine subsurface soil samples from 9 to 12 feet bgs (see Figure 2-2). The soil samples were analyzed in the field for benzene, toluene, ethylbenzene, and xylenes (BTEX) and TPHC. No BTEX was detected in any of the soil samples collected during the TerraProbe survey. TPHC was detected in three samples (TP-01, TP-02 and TP-03) at concentrations ranging from 91 to 380 ppm (see Figure 4-2 and Table 4-2). As noted in Table 4-2, noncalibrated petroleum hydrocarbons were detected in the field gas chromatograph (GC) analysis for TP-02 and TP-03. This note indicates that hydrocarbons were detected, however, the GC was not calibrated for the individual compounds detected. Because of this all of the peaks detected during these GC runs were grouped together as noncalibrated petroleum hydrocarbons. A soil boring (43N-92-01X) was completed adjacent to TP-03 so that confirmation samples could be collected (see Figure 2-2). One soil sample from 12 to 14 feet bgs was submitted for laboratory analysis consisting of VOCs, lead, and TPHC. No VOCs were detected in the sample, and lead was detected below the Fort Devens background concentration. TPHC was detected at 258 micrograms per gram ( $\mu\text{g/g}$ ) (see Figure 4-3 and Table 4-3).

---

ABB Environmental Services, Inc.

## SECTION 4

---

One subsurface soil sample was collected from each of the monitoring well borings completed during the SSI (see Figure 4-3 and Table 4-3). The soil samples were submitted for laboratory analysis consisting of VOCs, semivolatile organic compounds (SVOCs), lead, and TPHC. The results of the laboratory analysis indicated that VOCs and SVOCs were present in the soil samples collected, however, these compounds were identified as laboratory contaminants. Lead was detected below the Fort Devens background concentration in each of the soil samples, and TPHC was detected only in the soil sample collected from XNM-93-04X, at 215  $\mu\text{g/g}$  (see Figure 4-3 and Table 4-3).

### 4.2 GROUNDWATER

Two rounds of groundwater samples (round three and four) were collected from the monitoring wells installed during the SSI (see Figure 4-4). The water table was encountered in the bedrock at each monitoring well location, ranging from 10.3 to 16.6 feet bgs. The groundwater samples were submitted for laboratory analyses for VOCs, SVOCs, lead (both filtered and unfiltered), TPHC, and total suspended solids (TSS). The results of the third round of groundwater sampling indicated that toluene (0.84 micrograms per liter ( $\mu\text{g/L}$ )) was present in the sample collected from XNM-93-04X, and phenanthrene (0.59  $\mu\text{g/L}$ ) was detected in the sample collected from XNM-93-03X. No other VOCs or SVOCs were detected in the samples collected during third round of sampling. Lead was not detected above the Fort Devens background concentration in the four filtered or unfiltered groundwater samples collected in the third round. TPHC was not detected in the third round of groundwater samples (see Table 4-4 and Figure 4-4).

No VOCs or SVOCs were detected in the fourth round samples. Lead was detected above the Fort Devens background concentration in one of the four groundwater samples (8.01  $\mu\text{g/L}$  in XNM-93-01X). Lead was reported below the detection limit in each of the Round Four filtered samples. TPHC was detected in the sample collected from XNM-93-04X, only, at 580  $\mu\text{g/L}$  (see Table 4-4 and Figure 4-4).

## 5.0 PRELIMINARY HUMAN HEALTH RISK EVALUATION

The laboratory and field analytical results of the soil samples collected during the SI were used during the Preliminary Risk Evaluation (PRE) because these samples were collected from the former UST excavation or directly adjacent to the excavation. The soil sample collected from the monitoring well borings completed during the SSI were not used because the monitoring wells were not within the source area. The PRE for SA 43N used the most recent ABB-ES-calculated, risk-based concentration of 1,680  $\mu\text{g/g}$  and the MCP S-2/GW-1 soil standard for TPHC of 2,500  $\mu\text{g/g}$ .

Field analysis of 10 TerraProbe soil samples in the unsaturated zone revealed no measurable concentrations of BTEX to a depth of 12 feet. TPHC was detected above the method detection limit in three of 10 samples analyzed, ranging from 91 ppm to 380 ppm. One soil sample collected from the confirmatory boring advanced through the former tank location (43N-92-01X) showed residual TPHC concentrations of 258  $\mu\text{g/g}$ . Lead concentrations were below the Fort Devens background concentration (Table 5-1).

These results indicate that little residual contamination exists from petroleum products at SA 43N in the unsaturated zone. A comparison of the soil results to the MCP S-2/GW-1 soil concentration value of 2,500  $\mu\text{g/g}$  and the calculated risk-based concentration for gasoline of 1,680  $\mu\text{g/g}$  indicates that there should be no significant risk to public health from exposure to the soil at SA 43N.

The only organic contaminants detected in the groundwater samples were toluene and phenanthrene. The single detection of toluene did not exceed the federal Maximum Contaminant Level (MCL), and no standard or guideline was available for phenanthrene. Phenanthrene was detected in one of four samples at 0.59  $\mu\text{g/L}$ .

The unfiltered lead results were used to assess the potential human health risk. Lead was detected in two of the four samples collected. The maximum concentration of lead (4.01  $\mu\text{g/L}$  in one filtered sample) is below the USEPA action level of 15  $\mu\text{g/L}$ . TPHC was also detected in one groundwater sample at 580  $\mu\text{g/L}$ , however, this concentration is below the MCP Method 1 GW-1 concentration of 1,000  $\mu\text{g/L}$  (Table 5-2).

Based on the results of the PRE, it does not appear that the contaminants detected in the groundwater at SA 43N would pose a risk to human health.

---

ABB Environmental Services, Inc.

THIS PAGE INTENTIONALLY LEFT BLANK



**6.0 PRELIMINARY ECOLOGICAL RISK EVALUATION**

A preliminary ecological risk evaluation was not prepared for SA 43N because contaminants associated with a UST would be confined to subsurface soil, and would not impact any ecological receptors.

THIS PAGE INTENTIONALLY LEFT BLANK

## 7.0 CONCLUSIONS

The objectives of the SI and the SSI field investigations at SA 43N were to determine if the former historic gas station activities had adversely impacted the soil or groundwater quality at the site. Based on the results of the samples collected from SA 43N, it does not appear that the soil or groundwater quality in the vicinity of SA 43N have been adversely impacted by past activities. Therefore, no further action is recommended for this historic gas station.

THIS PAGE INTENTIONALLY LEFT BLANK

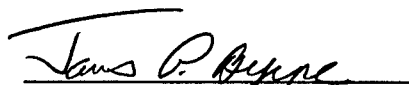
## 8.0 DECISION

On the basis of findings at SA 43N, there is no evidence or reason to conclude that petroleum contamination from the former UST has caused significant environmental contamination or pose a threat to human health or the environment. The decision has been made to remove SA 43N from further consideration in the IRP process. In accordance with CERCLA 120 (h) (3), all remedial actions necessary have taken place, and the USEPA and MADEP signatures constitute concurrence in accordance with the same.

  
JAMES C. CHAMBERS  
BRAC Environmental Coordinator

18 JAN 95  
Date

## U.S. ENVIRONMENTAL PROTECTION AGENCY


  
JAMES P. BYRNE  
Fort Devens Remedial Project Manager

1/18/95  
Date

☒ Concur

☐ Non-concur (Please provide reasons for non-concurrence in writing)

## MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

  
D. LYNNE WELSH  
Section Chief, Federal Facilities - CERO

1/18/95  
Date

☒ Concur

☐ Non-concur (Please provide reasons for non-concurrence in writing)

---

ABB Environmental Services, Inc.

THIS PAGE INTENTIONALLY LEFT BLANK

## GLOSSARY OF ACRONYMS AND ABBREVIATIONS

---

ABB-ES	ABB Environmental Services, Inc.
ATEC	ATEC Environmental Consultants
bgs	below ground surface
BRAC	Base Realignment and Closure
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DoD	U.S. Department of Defense
gpm	gallons per minute
GPR	ground penetrating radar
IRP	Installation Restoration Program
LUST	leaking underground storage tank
MCL	Maximum Contaminant Level
MCP	Massachusetts Contingency Plan
MEP	Master Environmental Plan
MSL	mean sea level
NDIR	Non-Dispersive Infrared
PA	Enhanced Preliminary Assessment
PID	photoionization detector
ppm	part per million
PRE	Preliminary Risk Evaluation
SA	Study Area
SI	site investigation
SSI	supplemental site investigation
SVOC	semivolatile organic compounds
TPHC	total petroleum hydrocarbon compounds
TSS	total suspended solids

---

**ABB Environmental Services, Inc.**

## **GLOSSARY OF ACRONYMS AND ABBREVIATIONS**

---

USAEC	U.S. Army Environmental Center
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
$\mu\text{g/g}$	micrograms per gram
$\mu\text{g/L}$	micrograms per liter
VOC	volatile organic compound

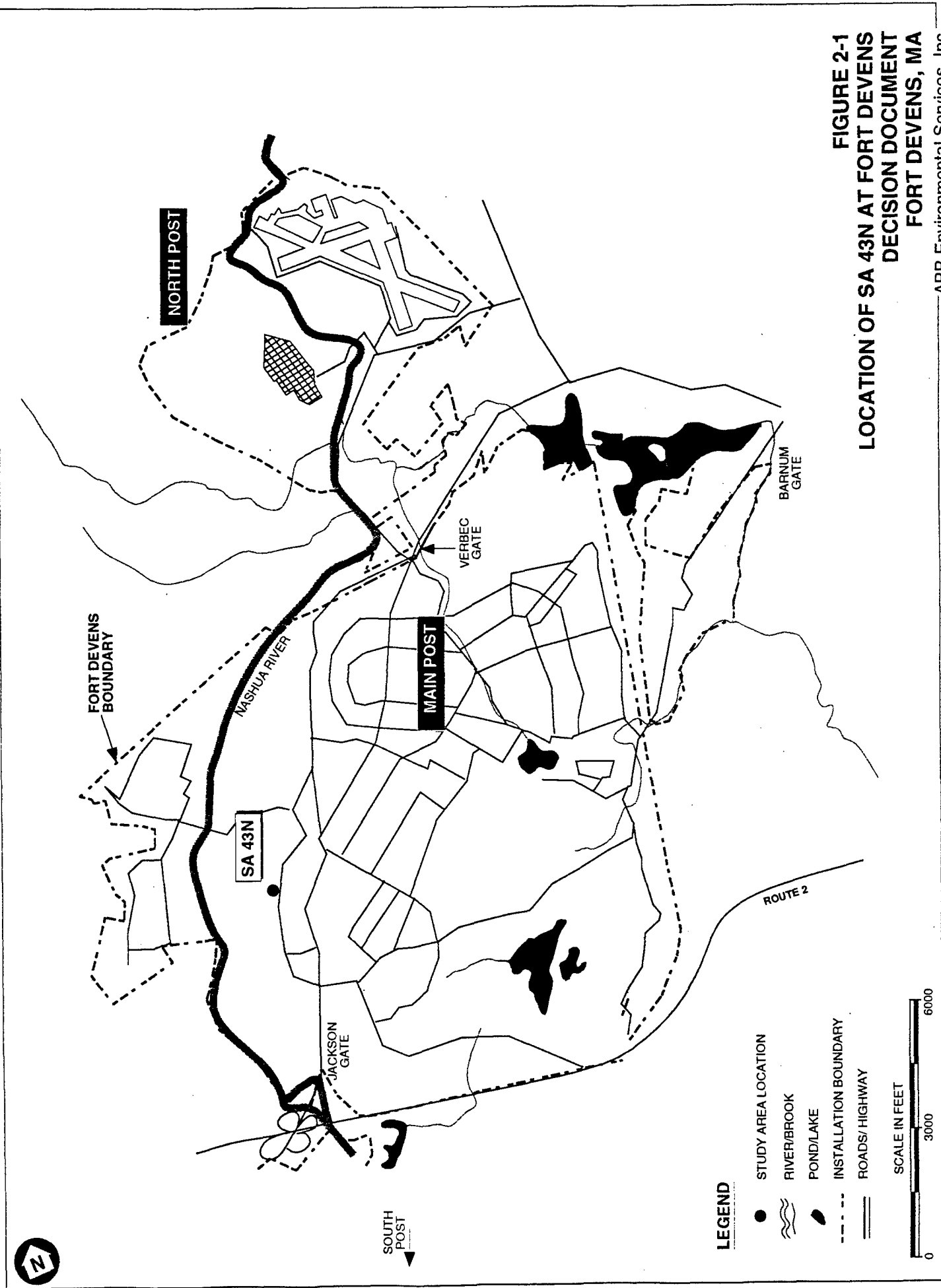


## REFERENCES

---

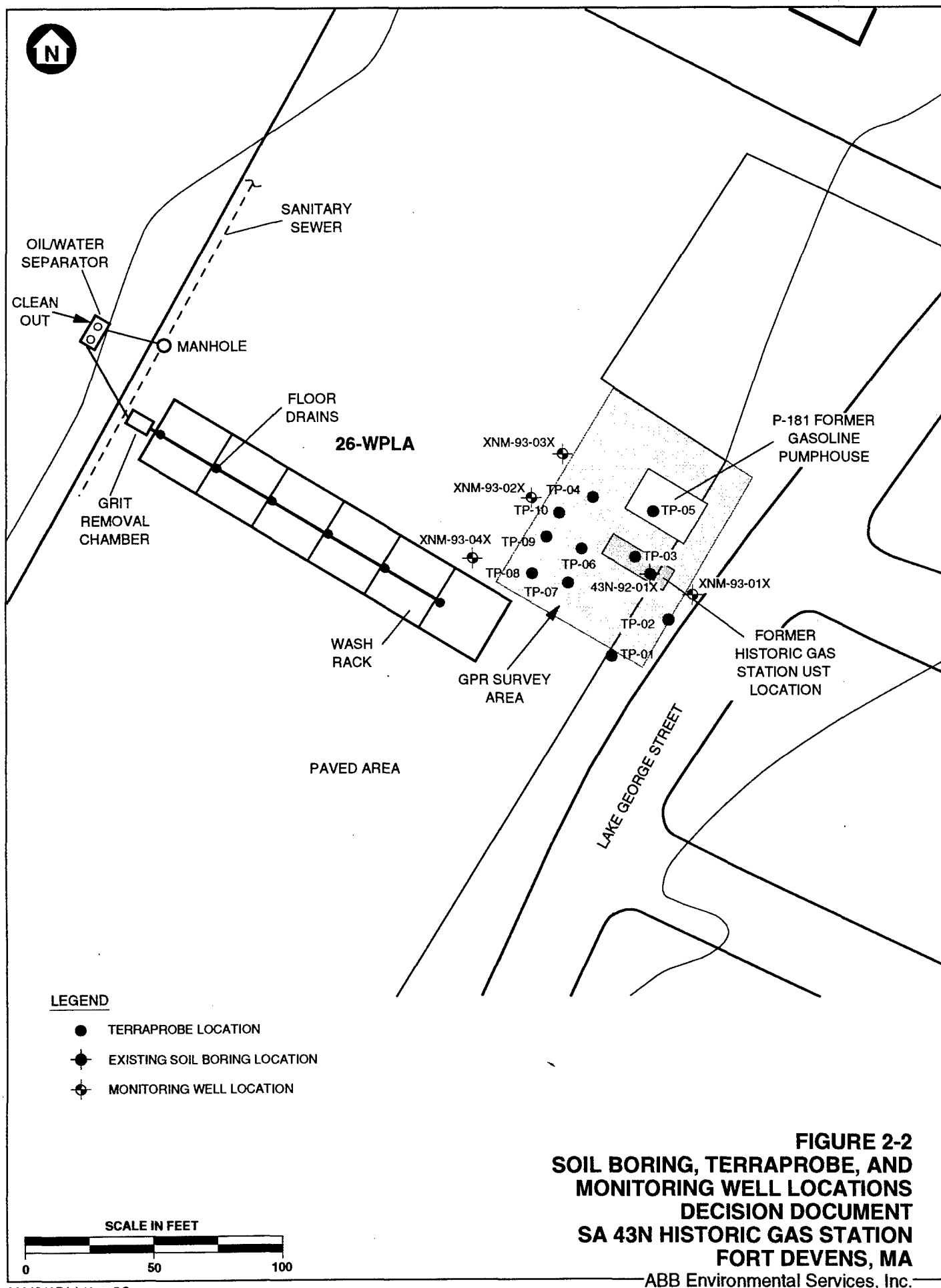
- ABB Environmental Services, Inc. (ABB-ES), 1993. "Final Site Investigation Report - Groups 2, 7, and Historic Gas Stations, Fort Devens, Massachusetts"; Data Item A009; prepared for the U.S. Army Environmental Center by ABB Environmental Services, Inc., Portland, ME, May.
- ATEC Environmental Consultants (ATEC), 1992. "Post-Removal Report, Underground Storage Tank Closure, 5,000-Gallon Diesel Fuel, UST No. 0111, Building 2000, Fort Devens, Massachusetts"; ATEC File No. 37.07.91.07451; Norwell, MA; prepared for U.S. Army Directorate of Contracting; Fort Devens, MA; September 29.
- Barbour, F.A., c. 1941. "Fort Devens, Mass. General Layout Plan"; Plan 6101-710.1B; prepared for Construction Division, Office of Quartermaster General; Scale approximately 1:7,000.
- Biang, C.A., R.W. Peters, R.H. Pearl, and S.Y. Tsai, 1992. "Master Environmental Plan for Fort Devens, Massachusetts"; prepared for U.S. Army Toxic and Hazardous Materials Agency; prepared by Argonne National Laboratory, Environmental Assessment and Information Sciences Division; Argonne, IL; Final, April.
- Jahns, R.H., 1953. "Surficial Geology of the Ayer Quadrangle, Massachusetts"; Scale 1:31,680; U.S. Geological Survey.
- Koteff, C., 1966. "Surficial Geologic Map of the Clinton Quadrangle, Worcester County, Massachusetts;" U.S. Geological Survey Map GQ-567.

THIS PAGE INTENTIONALLY LEFT BLANK



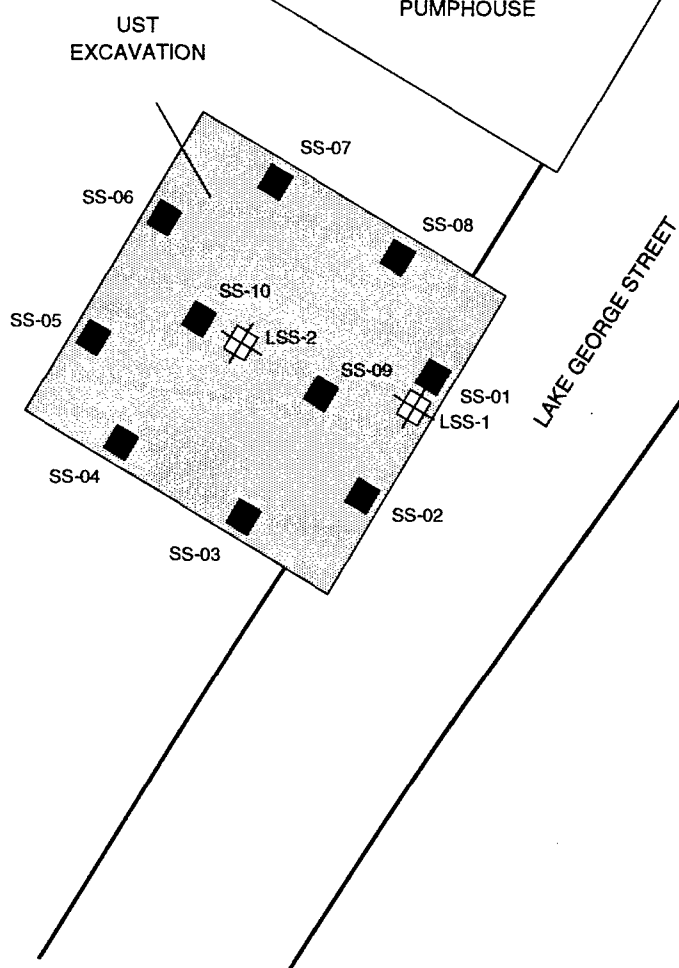
**FIGURE 2-1**  
**LOCATION OF SA 43N AT FORT DEVENS**  
**DECISION DOCUMENT**  
**FORT DEVENS, MA**

ABB Environmental Services, Inc.





26-WPLA



**LEGEND**



ATEC FIELD SCREENING LOCATIONS



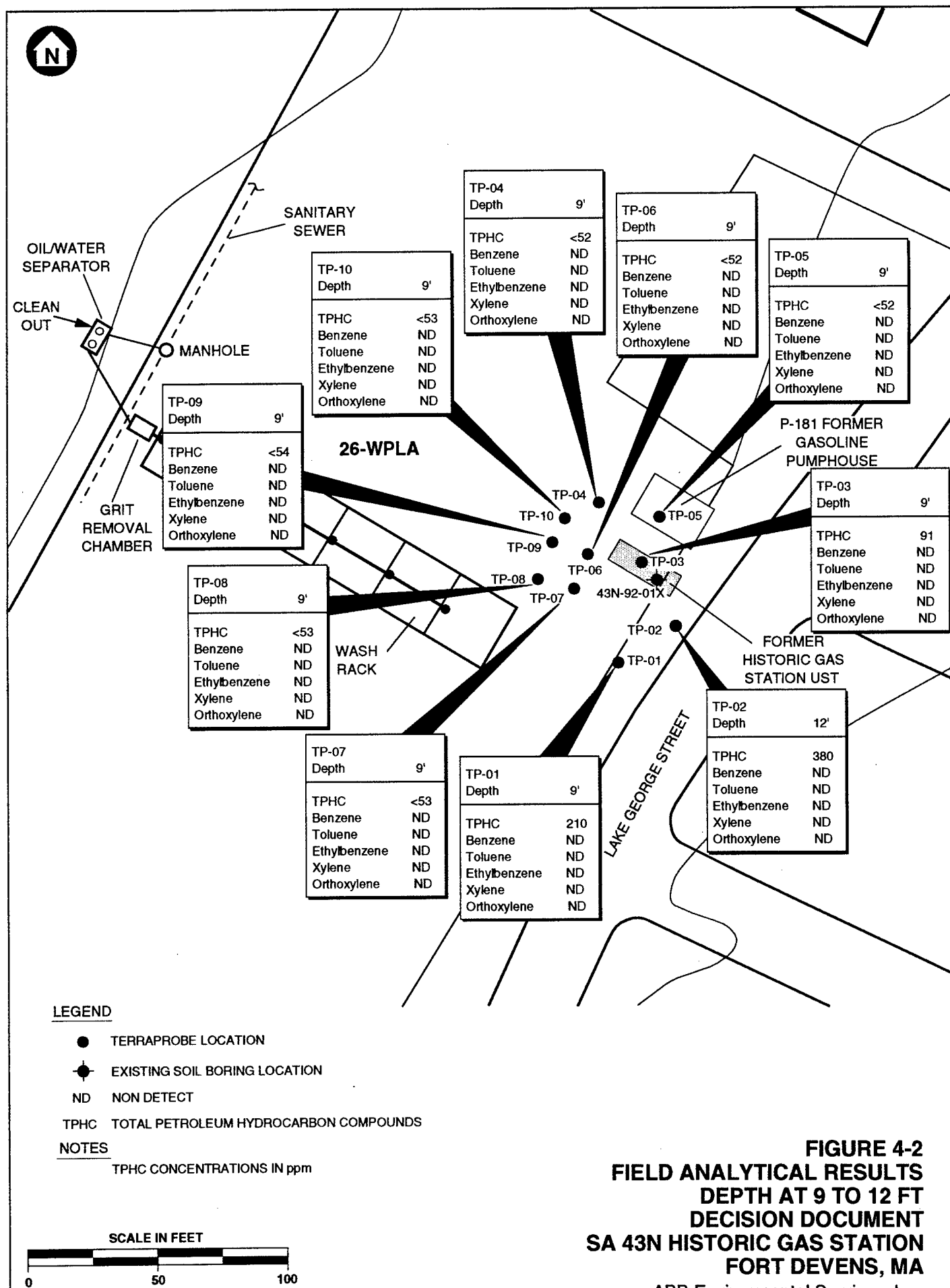
ATEC LABORATORY SOIL SAMPLE LOCATION

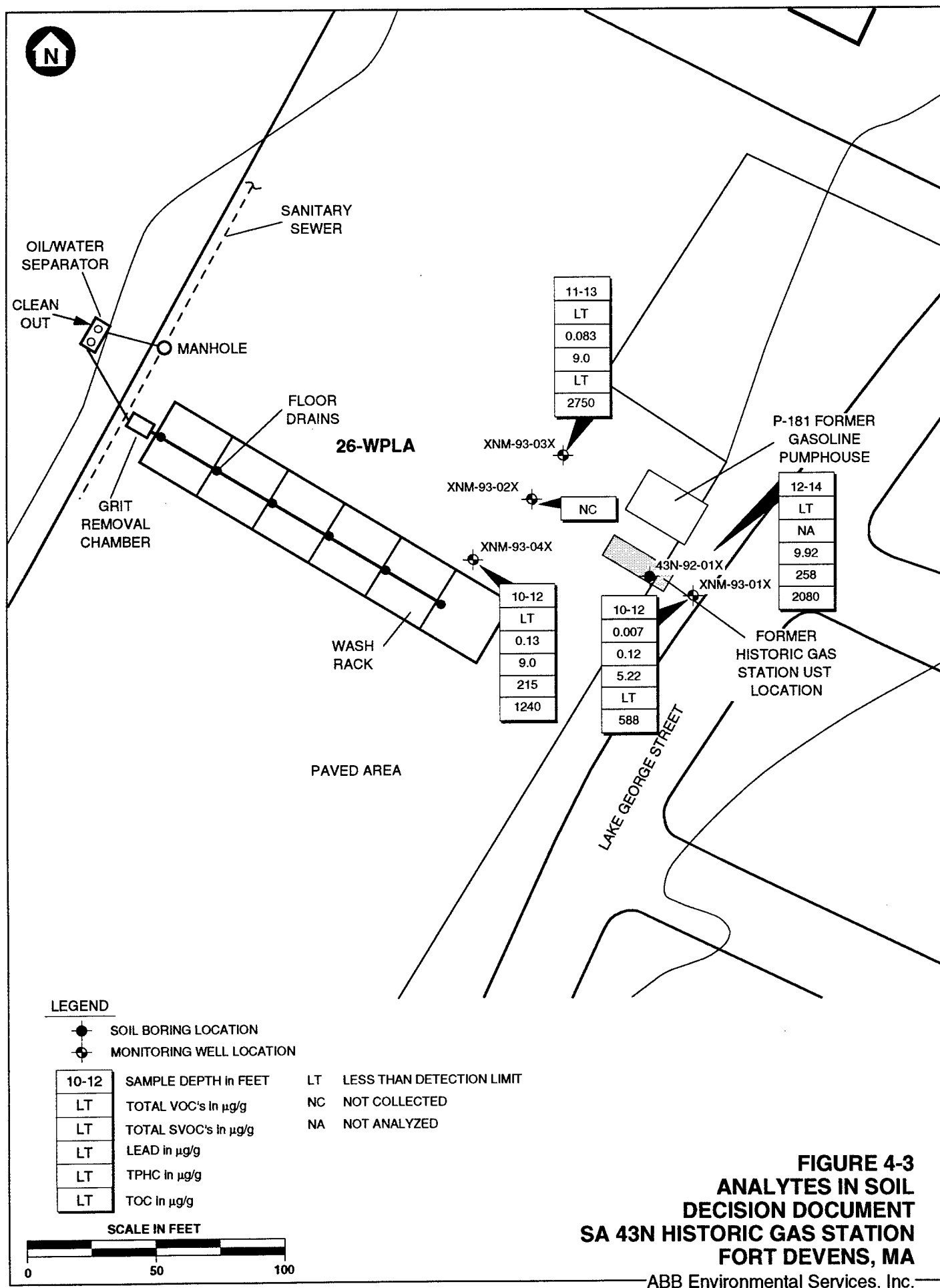
SCALE IN FEET

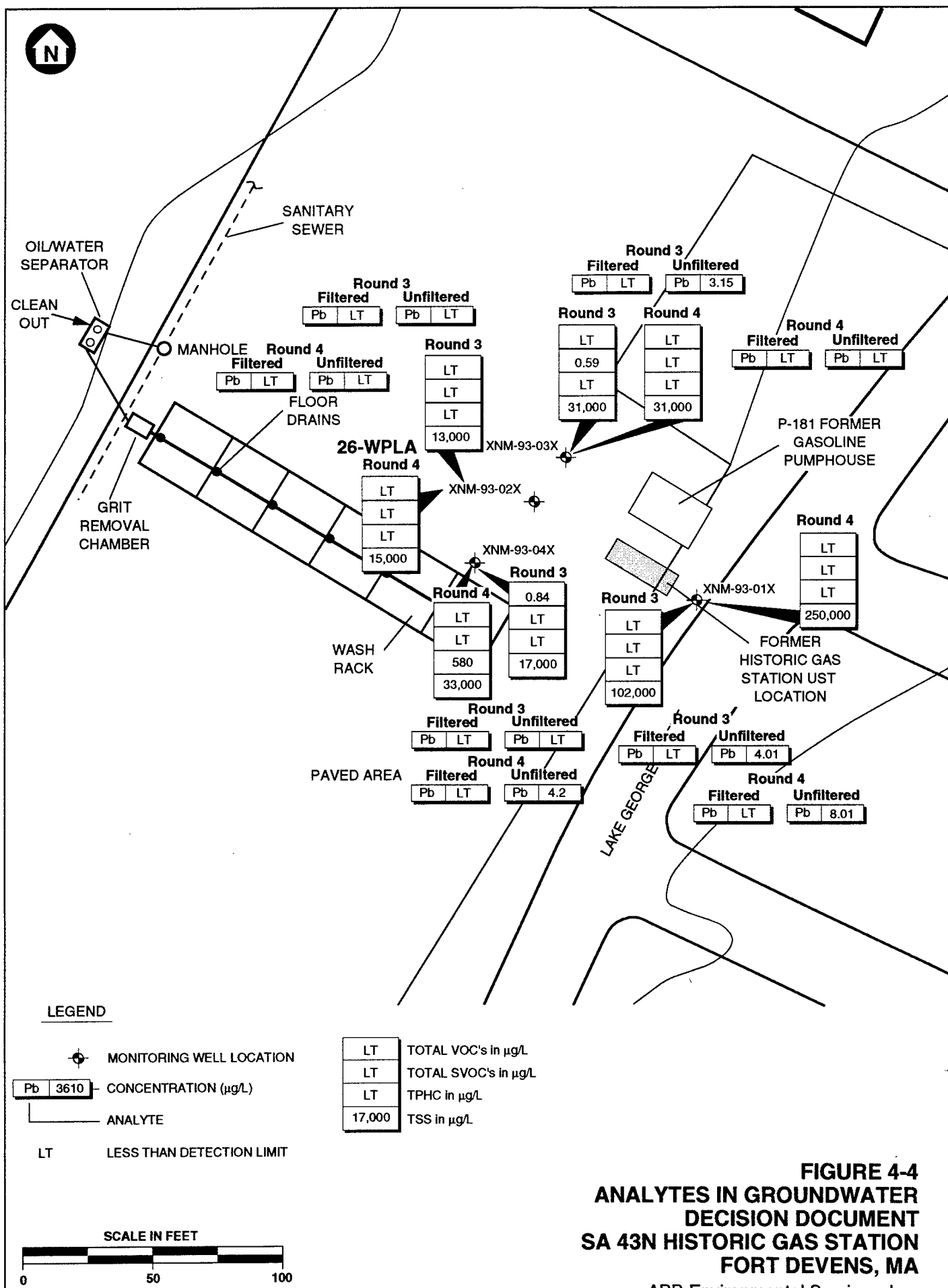


**FIGURE 4-1**  
**ATEC FIELD SCREENING LOCATIONS**  
**DECISION DOCUMENT**  
**SA 43N HISTORIC GAS STATION**  
**FORT DEVENS, MA**

ABB Environmental Services, Inc.









**TABLE 4-1**  
**ATEC FIELD SCREENING/LABORATORY RESULTS**  
**HISTORIC GAS STATION - SITE 43N**

**DECISION DOCUMENT**  
**FORT DEVENS, MA**

SAMPLE NO.	FIELD SCREENING		LABORATORY
	PID (ppm)	NDIR (ppm)	TPHC (ppm)
SS-1	56.0	37.5	N/A
SS-2	7.2	49.7	N/A
SS-3	39.0	61.1	N/A
SS-4	0.8	99.9	N/A
SS-5	2.5	83.2	N/A
SS-6	15.4	55.6	N/A
SS-7	7.8	46.7	N/A
SS-8	27	30	N/A
SS-9	3.6	28.8	N/A
SS-10	28.0	29.3	N/A
LSS-1	N/A	N/A	11
LSS-2	N/A	N/A	13
XNE-92-01X	N/A	N/A	136

NOTES:

SS = ATEC FIELD SCREENING SOIL SAMPLE

LSS = ATEC LABORATORY SOIL SAMPLE

XNE-92-01X = ABB-ES LABORATORY COMPOSITE SOIL SAMPLE

N/A = NOT APPLICABLE

TABLE 4-2  
FIELD ANALYTICAL RESULTS  
HISTORIC GAS STATION - SITE 43N

DECISION DOCUMENT  
FORT DEVENS, MA

SAMPLE ID	SA #	MEDIUM	SITE ID	DEPTH (feet)	TPHC ppm	TOTAL BTX ppb	BEN* ppb	TOL* ppb	E-BEN* ppb	M/P XYL** ppb	O-XYL* ppb	COMMENTS
43TSN01XX901XF	43N	SOIL	TP-01	9	210	0	ND	ND	ND	ND	ND	
43TSN02X1201XF	43N	SOIL	TP-02	12	380	0	ND	ND	ND	ND	ND	*** PHC's Detected
43TSN03XX901XF	43N	SOIL	TP-03	9	91	0	ND	ND	ND	ND	ND	*** PHC's Detected
43TSN04XX901XF	43N	SOIL	TP-04	9	<52	0	ND	ND	ND	ND	ND	
43TSN05XX901XF	43N	SOIL	TP-05	9	<52	0	ND	ND	ND	ND	ND	
43TSN06XX901XF	43N	SOIL	TP-06	9	<52	0	ND	ND	ND	ND	ND	
43TSN07XX901XF	43N	SOIL	TP-07	9	<53	0	ND	ND	ND	ND	ND	
43TSN08XX901XF	43N	SOIL	TP-08	9	<53	0	ND	ND	ND	ND	ND	
43TSN09XX901XF	43N	SOIL	TP-09	9	<54	0	ND	ND	ND	ND	ND	
43TSN10XX901XF	43N	SOIL	TP-10	9	<53	0	ND	ND	ND	ND	ND	

NOTES:

\* = ND DENOTES A NON DETECT OR CONCENTRATIONS BELOW 5 PPB

\*\* = ND DENOTES A NON DETECT OR CONCENTRATIONS BELOW 10 PPB

\*\*\* = DETECTION OF NONCALIBRATED PETROLEUM HYDROCARBON PEAKS

# = STUDY AREA

TABLE 4-3  
ANALYTES IN SUBSURFACE SOIL  
HISTORIC GAS STATION - SITE 43N

DECISION DOCUMENT  
FORT DEVENS, MA

ANALYTE	BACKGROUND	SSI			SI
		XNM-93-01X 10 FT	XNM-93-03X 13 FT	XNM-93-04X 12 FT	
ORGANICS ( $\mu\text{g/g}$ )					
DI-N-BUTYL PHTHALATE		0.12	0.083	0.13	< 0.1
TRICHLOROFLUOROMETHANE		0.007	< 0.006	< 0.006	< 0.006
INORGANICS ( $\mu\text{g/g}$ )					
LEAD	36.9	5.22	9.0	9.0	9.92
OTHER ( $\mu\text{g/g}$ )					
TOTAL ORGANIC CARBON		588	2750	1240	2080
TPHC		< 28.5	< 28.5	215	258

NOTES:

< = LESS THAN DETECTION LIMIT

TABLE 4-4  
ANALYTES IN GROUNDWATER  
HISTORIC GAS STATION - SITE 43N

DECISION DOCUMENT  
FORT DEVENS, MA

ANALYTE	BACKGROUND	XNM -93 -01X				XNM -93 -02X			
		Filtered ROUND 3	Unfiltered ROUND 3	Filtered ROUND 4	Unfiltered ROUND 4	Unfiltered ROUND 3	Unfiltered ROUND 3	Unfiltered ROUND 4	Unfiltered ROUND 4
ORGANICS (µg/L)									
TOLUENE		NA	< 0.5	< 0.5	< 0.5	NA	< 0.5	NA	< 0.5
PHENANTHRENE		NA	< 0.5	< 0.5	< 0.5	NA	< 0.5	NA	< 0.5
INORGANICS (µg/L)									
LEAD	4.25	< 1.26	4.01	< 1.26	8.01	< 1.26	< 1.26	< 1.26	< 1.26
OTHER (µg/L)									
TPHC		NA	< 180	NA	< 180	NA	< 180	NA	< 180
TOTAL SUSPENDED SOLIDS		NA	102000	NA	250000	NA	13000	NA	15000

NOTES:

< = LESS THAN DETECTION LIMIT  
NA = NOT ANALYZED

TABLE 4-4  
ANALYTES IN GROUNDWATER  
HISTORIC GAS STATION - SITE 43N

DECISION DOCUMENT  
FORT DEVENS, MA

ANALYTE	BACKGROUND	XNM-93-03X				XNM-93-04X			
		Filtered ROUND 3	Unfiltered ROUND 3	Filtered ROUND 4	Unfiltered ROUND 4	Filtered ROUND 3	Unfiltered ROUND 3	Filtered ROUND 4	Unfiltered ROUND 4
ORGANICS ( $\mu\text{g/L}$ )									
TOLUENE		NA	< 0.5	NA	< 0.5	NA	0.84	NA	< 0.5
PHENANTHRENE		NA	0.59	NA	< 0.5	NA	< 0.5	NA	< 0.5
INORGANICS ( $\mu\text{g/L}$ )									
LEAD	4.25	< 1.26	3.15	< 1.26	< 1.26	< 1.26	< 1.26	< 1.26	4.2
OTHER ( $\mu\text{g/L}$ )									
TPHC		NA	< 180	NA	< 190	NA	< 180	NA	580
TOTAL SUSPENDED SOLIDS		NA	31000	NA	31000	NA	17000	NA	33000

NOTES:

< = LESS THAN DETECTION LIMIT

NA = NOT ANALYZED

TABLE 5-1  
HUMAN HEALTH PRE EVALUATION OF SUBSURFACE SOIL  
HISTORIC GAS STATION - SITE 43N

DECISION DOCUMENT  
FORT DEVENS, MA

ANALYTE	FREQUENCY OF DETECTION	DETECTED CONCENTRATION [a]		SOIL BACKGROUND CONCENTRATION [b] (µg/g)	MAXIMUM EXCEEDS BACKGROUND ?	REGION III COMMERCIAL/ INDUSTRIAL CONCENTRATION (µg/g)	MCP S-2 (µg/g)	MAXIMUM EXCEEDS GUIDELINE CONCENTRATION ?
		AVERAGE (µg/g)	MAXIMUM (µg/g)					
INORGANICS								
LEAD	1/1	9.92	9.92	48.4	NO	500	600	NO
OTHER								
TPHC	3/10	227	380	NA	-	1680	2500	NO

Notes:

[a] SUBSURFACE SOIL (3 TO 15 FEET) FROM SAMPLE LOCATIONS 43N-92-01X (1 DEPTH)

[b] BASE-WIDE BACKGROUND SOIL INORGANICS DATABASE

NA = NOT AVAILABLE

$\mu\text{g/g}$  = MICROGRAMS PER GRAM

- = NOT APPLICABLE

MCP = MASSACHUSETTS CONTINGENCY PLAN

TABLE 5-2  
HUMAN HEALTH PRE EVALUATION OF GROUNDWATER  
HISTORIC GAS STATION - SITE 43N

DECISION DOCUMENT  
FORT DEVENS, MA

ANALYTE	FREQUENCY OF DETECTION	DETECTED CONCENTRATION [a]		GROUNDWATER BACKGROUND CONCENTRATION (µg/L)	MAXIMUM EXCEEDS BACKGROUND 7	DRINKING WATER STANDARD/ GUIDELINE [b] (µg/L)	MAXIMUM EXCEEDS STANDARD/ GUIDELINE 7
		AVERAGE (µg/L)	MAXIMUM (µg/L)				
ORGANICS							
PHENANTHRENE	1/8	0.59	0.59	NA	-	NA	-
TOLUENE	1/8	0.84	0.84	NA	-	1000	NO
INORGANICS							
LEAD	4/8	4.84	8.01	4.25	YES	15	NO
OTHER							
TPHC	1/8	580	580	NA	-	1000	NO

NOTES:

[a] GROUNDWATER BASED ON UNFILTERED SAMPLES FROM XNM-93-01X TO XNM-93-04X

[b] INCLUDES THE LOWEST OF EITHER THE EPA OR MA DRINKING WATER STANDARDS, OR IF NO FEDERAL

STANDARD OR GUIDELINE IS AVAILABLE, THE REGION III TAP WATER CONCENTRATIONS

NA = NOT AVAILABLE

µg/L = MICROGRAMS PER LITER

- = NOT APPLICABLE